

The Interplay of Biostimulants and Climate Change in Olive Culture

Mahdi Sabaghi*

Department of Mechanical Engineering, University of Ecole Polytechnique de Montreal, Montréal, Canada

Introduction

Agriculture is put in risk by an increase in the frequency of droughts, heat waves, and floods since they stunt plant development and output. The Mediterranean region, a hotspot for climate change, is particularly vulnerable to traditional agricultural systems like olive trees. In the Mediterranean region, intensive and conventional olive producing techniques coexist. Irrigation and agricultural chemical inputs have expanded globally to achieve high productivity and profitability, despite the fact that the requirements for water and agricultural chemicals for the two systems are different. Finding sustainable ways to maintain high productivity in the face of ongoing climate change is crucial if the EU-Farm to Fork strategy and climate neutrality are to be realised. Biostimulants are a good example of an eco-friendly replacement. [1].

Description

These are chemicals or microorganisms that stimulate the metabolism and signalling pathways in plants, improving their quality, yield, and resistance to stress. These benefits include of increased growth, nutritional status, and water accessibility, which lessens the requirement for irrigation and agrochemicals. In this review, numerous biostimulants (such as seaweed, protein hydrolysates, humic compounds, microbes, and nanomaterials) are discussed along with their modes of action and potential uses in agriculture. We also look into the present state of the art for biostimulant use in olive growth and their potential advantages for boosting resistance to biotic stresses. [2].

Due to rising food demand to feed a growing global population, strong competition for limited natural resources, and concerns from climate change, agriculture is experiencing unprecedented difficulties. Arable land is under pressure from a growing world population, which increases productivity at the expense of more agrochemical use (e.g., fertilisers and pesticides). Additionally, climate change poses a challenge to the security and production of food globally. Droughts and heat waves in particular are predicted to increase in frequency and intensity, resulting in significant socioeconomic and biodiversity losses. In this situation, several adjustments must be made, starting with the development of more sustainable agriculture practises while minimising resource deterioration. The European Union's Farm to Fork strategy includes several goals to adapt to climate change and boost crop production. [3].

***Address for Correspondence:** Mahdi Sabaghi, Department of Mechanical Engineering, University of Ecole Polytechnique de Montreal, Montréal, Canada, E-mail: mahdisabaghi222@gmail.com

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In contrast to synthetic fertilisers, insecticides, and other agrochemicals that are frequently used in agriculture to increase crop yield, biostimulants are natural substances. Through their influence on a number of molecular and physiological processes, biostimulants enhance plant performance. Pesticides and fertilisers help plants by giving them the nutrients they need for cell growth and metabolism, and fertilisers help with weed and pest control (extermination). However, when used improperly, these substances can have a detrimental effect on the ecosystems of the soil, water, and air as well as on human health. Biostimulants' natural origins mean that most of its components have a minimal negative influence on the environment. When used at the prescribed application rates, biostimulants have been shown to be biodegradable, non-polluting, and non-hazardous/non-toxic to a range of organisms.

Biostimulants are different from the artificial substances that are frequently used in agriculture to increase crop yield, such as inorganic fertilisers that contain nitrogen and phosphorus, insecticides, and other agrochemicals. By influencing a number of physiological and molecular processes, biostimulants enhance plant performance. Fertilizers give plants the nutrients they require for cell growth and metabolism, and pesticides help with weed and pest control (extermination), but their imbalanced usage is bad for the environment, human health, and many elements of the water, air, and soil ecosystems. Because most of its components are natural, biostimulants have a smaller negative influence on the environment. According to reports, biostimulants are non-hazardous/non-toxic to a range of organisms, biodegradable, and non-polluting when used at the prescribed application rates. [4,5].

Conclusion

To support the EU's Farm to Fork agricultural plan, adapt to climate change, and enhance agroecosystem biodiversity, agriculture production must evolve. As a result, in recent decades there has been a rise in the search for novel and sustainable agriculture methods. The use of biostimulants, which can be natural products, microorganisms, or even nanomaterials, emerges as a sustainable strategy under the actual context of climate change to achieve the goal of developing a more sustainable agricultural production and lowering irrigation water requirements and agrochemical needs. Biostimulants are still extremely rarely used in olive culture as opposed to other crops like grapes. However, the encouraging outcomes, notably in the management of several significant olive disorders, offer encouraging possibilities for their application to other illnesses as well as enhancing olive

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